Research fellowship on "Development of novel, sustainable catalytic chemical valorization pathways of biomass derived crotonic acid" - Università Ca' Foscari Venezia
(Italian law 30 December 2010, n.240, art. 22 and subsequent amendments and additions)

The present document in English is to be considered as a mere summary of the main provisions of the notice of competition which is available in Italian at the following (link) The text in Italian is the official text of the notice of competition for all legal intents and purposes and, in the event of non-conformity with the present document, it shall prevail.

Description

The Department of Molecular Sciences and Nanosystems at Università Ca' Foscari Venezia invites applications for a fellowship titled "**Development of novel, sustainable catalytic chemical valorization pathways of biomass derived crotonic acid** ", SSD: CHIM/06, project PRIN 2022 titled "2022KK2HTL - RECHEWS: Renewable Chemicals from Wastewater Treatment Sludge" CUPH53D23001320006, tutor and principal investigator: prof.ssa Giulia Fiorani.

The fellowship is intended to provide the successful candidate with the opportunity to pursue his/her own research while benefiting from the range of expertise at Università Ca' Foscari Venezia.

Abstract: The amount of wastewater treatment sludge (WWTS) produced in EU by the treatment of urban and industrial wastewater is 6 and 4 Mt/y on a dry basis, respectively. The organic matter contained in WWTS is virtually enormous (just in the EU, more than 6 Mt/y measured as Chemical Oxygen Demand, COD) and available as a substrate for producing bio-based products. Therefore, the development of novel strategies to employ WWTS as feedstock for the synthesis of renewable chemicals would be valuable in terms of circular economy and reduction of fossil resources exploitation. For example, WWTS can be selectively converted into polyhydroxyalkanoates (PHA) rich materials by a hybrid thermochemical and biological process that treat WWTS combining hydrothermal carbonization and a defined sequence of biological steps based on microbial mixed cultures (MMC).

RECHEWS aims at improving the above-mentioned process to produce drop-in chemicals through a solvent free approach based on thermolytic distillation of PHA rich material, yielding high purity crotonic acid and other relevant drop-in chemicals. The RECHEWS project will open a totally new conversion pathway of "WWTS-to-chemicals" by converting the C atoms in WWTS into crotonic acid (CA) and other drop-in chemicals, by developing sustainable catalytic valorization technologies, including continuous flow approaches.

RECHEWS is organized in 4 work packages: WP1 (month 1-18) is focused on the transformation of sludge into CA. Sludge will be provided by CAVIRO EXTRA. WP2 (month 1-24) is focused on conversion of CA into selected drop-in chemicals via sustainable chemistry. WP3 (month 13-24) will evaluate the sustainability of the whole process from the technical and environmental perspectives, compared to the production of CA and CA derived chemicals obtained from fossil resources. WP4 (months 1-24) is designed to integrate all the technical WPs, as well as improving communication between the two partners and designing and programming dissemination activities.

The candidate will be involved in WP2, which is focused on the chemical valorization of crotonic acid in selected drop-in chemicals. WP2 comprises 4 tasks:

- Development of sustainable esterification protocols for the synthesis of alkyl crotonates, employing alcohols and/or dialkyl carbonates in batch and continuous flow experimental conditions;

- Selective epoxidation of crotonate esters employing environmentally benign oxidants in batch and

continuous flow experimental conditions;

- High atom economy chemical valorization approaches, exploiting the Diels Alder reactivity of alkyl crotonates;

- Development of sustainable self and cross-metathesis protocols of alkyl crotonates employing non-endangered metals and/or continuous flow experimental setups.The work will take place at the Department of Molecular Sciences and Nanosystems of the Ca' Foscari University of Venice.

Who can apply

Prospective candidates are expected to hold a Master's Degree in **Chemistry/Chemistry and sustainable technologies, Chemical Engineering/Sciences and technologies of bio and nanomaterials and related degrees** (or equivalent) or equivalent qualification obtained abroad and professional scientific curriculum suitable for carrying out research activities.

Ca' Foscari encourages applications from researchers with positive evaluation in all the criteria in individual proposals such as Marie Skłodowska Curie Actions - Individual Fellowships/ERC Starting Grants/FIRB (Italian Fund for basic research investments)/SIR (Scientific Young Independence Research) or similar.
Researchers having successfully completed Marie Skłodowska Curie Actions - Individual Fellowships/ERC Starting Grants/FIRB (Italian Fund for basic research investments)/SIR (Scientific Young Independence Research) or similar funded projects are warmly encouraged to apply.

The following qualifications are considered as evaluation criteria:

a. holding a PhD;
b. having completed the attendance of a PhD programme, although not having yet obtained the PhD title;
c. specialisation diplomas and attendance certificates at post-graduate specialisation courses, obtained both in Italy or abroad, documented research activity in public and private organisations with contracts, study grants or assignments both in Italy and abroad.

Duration of contract: 12 months, approximately starting: in **January 2024.**

Stipend: The research fellowship amounts to **€ 19.367,00 Euros** gross to the recipient per year, net of the expenses to be sustained by the Provider.

Deadline for submission of applications: 11th December 2023, at 12.00 noon.

How to apply:

Candidates shall submit:
1. The application form;
2. A motivation letter (max 1 page) along with their CV in European format, **with graduation grade**, duly dated and signed, both to enclosed as a one single.pdf file (link); a declaration must be appended in the footnote of the curriculum, pursuant to the Italian DPR 445/2000 and subsequent amendments and additions, that the information provided corresponds to the truth. Moreover the candidates have to consent to the use of their personal data for the purposes of

this selection procedure pursuant to the Italian Legislative Decree 196/2003 and to the EU Regulations 2016/679;
3. The attachments called "obligations and understanding" and "participation and compatibility";
4. All documents, qualifications and publications relevant for the selection procedure (please, see the notice - link);
5. A copy of a valid identity document (either Identity Card or Passport);
6. (If available) Evaluation Summary Reports of Marie Skłodowska Curie Actions - Individual Fellowships/ ERC Starting Grants/FIRB (Italian Fund for basic research investments)/SIR (Scientific Young Independence Research) individual proposals having passed all the evaluation thresholds;
7. (If available) Details of Marie Skłodowska Curie Actions - Individual Fellowships, ERC Starting Grants, FIRB (Italian Fund for basic research investments)/ SIR Scientific Young Independence Research funded projects;
8. Declaration on availability to held the interview in remote (Link) to be send via email at the following address: ricerca.dsmn@unive.it

All the schemes of the quoted documentation are available on the website (link).

Incomplete applications will be rejected.

How to submit your application

Applications should be submitted by the online procedure, available here:

https://apps.unive.it/domandeconcorso-en/accesso/dsmn-assegnoprin22fiorani2023

By inserting their Italian Tax Code.

Foreign citizens not yet in possesion of the Italian Tax Code can use the following link https://apps.unive.it/utils/cf to obtain a temporary one and be able to proceed with the request.
The candidate, after the uploading, will receive a submission number and an e-mail acknowledging receipt of his/her application.
The candidate if necessary could access the procedures for updating any data and materials by the link provided by the e-mail, in any case any updates must be made no later than the deadline 11th December 2023, at 12.00 noon.

Please note that the University can be contacted for any support needs by the candidate until 24 hours prior to the deadline.
Please note that in case of an high number of applications and / or weight of the materials loaded by the candidates the system might become slower, Therefore it is suggested not to start the process close to the deadline.

NB: the University does not take on responsibility for wrong or late communication of addresses, nor for any communication problem not depending on the University.

Topics of the interview:

- Sustainability of chemical valorization reactions of biomass derivatives, in particular using continuous flow conditions;
- Use of dialkyl carbonates in organic synthesis;
- Main synthetic and analytical methodologies used in organic synthesis;
- Assessment of the knowledge of the foreign English language through the conduct of part of the interview in English;
- Assessment of the Italian language for foreign candidates.

Evaluation

Up to 100 points, specifically:
For qualifications, publications and possible tests, from 0 to 60;
For interview, from 0 to 40.

Selection procedure

The interview will be on 18/12/2023 at 03:00 pm (Italian time).

The interview will be held in remote at the link:

meet.google.com/yiy-ahhu-fwb

Information and contacts

Candidates may find further details about the application process and the research project in the official call published on the following (link)
For further information please contact the Research Office, email: ricerca.dsmn@unive.it, Ph: 0412348633/8514.

Il Direttore del Dipartimento
di Scienze Molecolari e Nanosistemi
Prof. Maurizio Selva
f.to digitalmente ex art.24 Dlgs 82/2005 (CAD) e ss.mm.ii.

VISTO La responsabile del procedimento
La Segretaria del Dipartimento di Scienze Molecolari e Nanosistemi
Sonia Barizza: barizza@unive.it Telefono: 041-2348535